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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,538	03/24/2004	Arak Sutivong	030226	6148

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EXAMINER
PATEL, CHANDRAHAS B

ART UNIT	PAPER NUMBER
2616	

NOTIFICATION DATE	DELIVERY MODE
07/17/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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PTOL-90A (Rev. 04/07)

	Application No.	Applicant(s)	
Office Action Summary	10/809,538	SUTIVONG ET AL.	
	Examiner	Art Unit	
	Chandrahas Patel	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *10 May 2006*.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-20* is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-20* is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on <u>24 March 2004</u> is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All b) ☐ Some * c) ☐ None of:
       1. ☐ Certified copies of the priority documents have been received.
       2. ☐ Certified copies of the priority documents have been received in Application No. _____.
       3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date *5/10/2006*.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Pages 5-6, Paragraph 26 refer to terminal with reference number 520a. Terminal 520a is not shown in any or the drawings. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2.   The disclosure is objected to because of the following informalities: Applicant refers to antenna by reference number 420 on Page 11, Paragraph 47, while Fig. 4 shows antenna by reference number 402.

        Appropriate correction is required.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

    A person shall be entitled to a patent unless —

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4.   Claims 1-8, 12-20 are under 35 U.S.C. 102(e) as being anticipated by Narasimhan (USPN 7,016,651).

Regarding claim 1, Narasimhan teaches a method of estimating noise in an Orthogonal Frequency Division Multiplexing (OFDM) system **[Abstract]**, the method comprising: receiving OFDM symbols **[Abstract]**; and detecting a received power of a signal in an unassigned sub-carrier frequency band **[Abstract]**.

Regarding claim 2, Narasimhan teaches averaging the received power with at least one previously stored received power measurement for the unassigned sub-carrier frequency band **[Col. 7, lines 39-42, hard decisions are generated for each sub-carrier as defined in Col. 7, lines 29-38]**.

Regarding claim 3, Narasimhan teaches prior to detecting the received power, demodulating an unassigned sub-carrier corresponding to the unassigned sub-carrier frequency band **[Fig. 2, 220 is before 235, also see Col. 5, lines 61-67 – Col. 6, lines 1-8]**.

Regarding claim 4, Narasimhan teaches determining the unassigned sub-carrier frequency band based in part on a received message **[Col. 12, lines 20-26, where selecting one of the subsets will leave the other subset unassigned]**.

Regarding claim 5, Narasimhan teaches the unassigned sub-carrier frequency band based in part on an internally generated sequence **[Col. 12, lines 20-26, selection is done after FFT recovers the symbols]**.

Regarding claim 6, Narasimhan teaches wirelessly receiving, from a base station

transmitter, RF OFDM symbols **[Fig. 1, Col. 3, lines 19-23]**.

Regarding claim 7, Narasimhan teaches converting wirelessly received RF OFDM

symbols to baseband OFDM symbols **[Fig. 1, 120]**; removing a guard interval from the baseband

OFDM symbols **[Col. 3, lines 35-40]**; and transforming, using a Fast Fourier Transform (FFT),

time domain OFDM baseband signals to modulated sub-carriers **[Fig. 2, 208]**.

Regarding claims 8 and 20, Narasimhan teaches determining **one of a** magnitude,

amplitude, or **a squared magnitude** of the signal in the unassigned OFDM frequency band **[Col.
8, lines 57-64]**.

Regarding claim 12, Narasimhan teaches averaging the received power with at least one

previously stored received power measurement to produce a noise estimate corresponding to the

unassigned sub-carrier frequency band **[Fig. 4, 420]**; and communicating the noise estimate to a

transmitter **[Fig. 4, 435, 440]**.

Regarding claim 13, Narasimhan teaches transmitting the noise estimate from a terminal

transmitter to a base transceiver station **[Fig. 1, noise estimation is done in 120 which is then
passed to 135, Col. 3, lines 40-48]**.

Regarding claim 14, Narasimhan teaches a method of estimating noise in an Orthogonal

Frequency Division Multiplexing (OFDM) system **[Abstract]**, the method comprising: receiving

OFDM symbols in a wireless cellular communication system, the OFDM symbols corresponding

to a symbol period **[Abstract]**; determining an unassigned sub-carrier during the symbol period

**[Col. 12, lines 20-26, where selecting one of the subsets will leave the other subset
unassigned]**; determining a power, during the symbol period, of a signal in a frequency band

corresponding to the unassigned sub-carrier [**Abstract, only subset of sub-carriers are used to

derive SNR$_{geo}$**]; storing a value of the power of the signal in a memory; and averaging the power

of the signal with previously stored values to generate a noise estimate [**Col. 7, lines 39-42, hard

decisions are generated for each sub-carrier as defined in Col. 7, lines 29-38**].

     Regarding claim 15, Narasimhan teaches an apparatus for estimating noise in an

Orthogonal Frequency Division Multiplexing (OFDM) system [**Fig. 2**], the apparatus

comprising: a wireless receiver configured to wirelessly receive OFDM symbols corresponding

to an OFDM symbol period [**Fig. 1 and 2, 120**]; a detector configured to detect a received power

level of signals received by the wireless receiver during the OFDM symbol period [**Fig. 2, 210,

235**]; a processor coupled to the detector and configured to determine an unassigned sub-carrier

during the OFDM symbol period and determine a noise estimate based in part on a received

power level in a frequency band corresponding to the unassigned sub-carrier [**Fig. 4, 415, Col. 3,

lines 40-48, SNR$_{geo}$ corresponds to unassigned sub-carriers as shown in Col. 8, lines 8-13,

where different subsets will produce unassigned sub-carriers**].

     Regarding claim 16, Narasimhan teaches the apparatus comprising memory coupled to

the processor to store the noise estimates in the memory [**Fig. 4, 420 step shows comparing SQ

which is noise estimate from step 415 so the apparatus has to have memory coupled to

processor, also see Col. 10, lines 8-34**].

     Regarding claim 17, Narasimhan teaches the apparatus comprising a memory coupled to

the processor and storing a predetermined number of previously determined noise estimates

corresponding to the unassigned sub-carrier, the processor determining an average noise estimate

based in part on the noise estimate and the previously determined noise estimates [**Col. 7, lines**

29-42, the soft-decisions are noise estimates which would have to be stored if you want to get geometric mean so the apparatus has to have memory coupled to processor, also see Col. 10, lines 8-34].

Regarding claim 18, Narasimhan teaches the wireless receiver comprises: an RF receiver portion configured to wirelessly receive RF OFDM symbols and convert the RF OFDM symbols to the OFDM symbols [**Fig. 1, 120**]; a Fast Fourier Transform (FFT) module configured to receive the OFDM symbols from the RF receiver portion and transform the OFDM symbols to modulated sub-carriers [**Fig. 2, 208**]; and a demodulator coupled to the FFT module and configured to demodulate the modulated sub-carriers [**Fig. 2, 220**].

Regarding claim 19, Narasimhan teaches the detector detects the received power levels of an output of the demodulator [**Fig. 2, 235**].

Claim Rejections - 35 USC § 103

5.　　The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.　　Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan (USPN 7,016,651) in view of Vella-Coleiro (USPN 7,197,085).

Regarding claim 9, Narasimhan teaches a method as discussed in rejection of claim 1.

However, Narasimhan does note teach determining a sum of a square of a quadrature signal component with a square of an in-phase signal component.

Vella-Coleiro teaches determining a sum of a square of a quadrature signal component with a square of an in-phase signal component [Col. 4, lines 38-45].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to determine a sum of a square of a quadrature signal component with a square of an in-phase signal component so that index value can be calculated [Col. 4, lines 38-45].

7.   Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan (USPN 7,016,651) in view of Jones et al. (USPN 6,757,241).

Regarding claim 10, Narasimhan teaches a method as discussed in rejection of claim 1.

However, Narasimhan does not teach determining if the unassigned sub-carrier frequency band comprises a system wide unassigned sub-carrier frequency band; storing the detected received power as a noise plus interference estimate if the sub-carrier frequency band does not comprise the system wide unassigned frequency band; and storing the detected received power as a noise floor estimate if the sub-carrier frequency band comprises the system wide unassigned frequency band.

Jones teaches determining if the unassigned sub-carrier frequency band comprises a system wide unassigned sub-carrier frequency band [Col. 3, lines 35-38]; storing the detected received power as a noise plus interference estimate if the sub-carrier frequency band does not comprise the system wide unassigned frequency band [Col. 3, lines 49-55]; and storing the detected received power as a noise floor estimate if the sub-carrier frequency band comprises the system wide unassigned frequency band [Col. 4, lines 29-38].

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to store the detected receive power as a noise plus interference estimate if the sub-

carrier frequency is being used and only storing noise if the sub-carrier frequency band is not

used since in the absence of interference only noise is present **[Col. 4, lines 37-38]**.

8.   Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Narasimhan

(USPN 7,016,651) in view of Jones et al. (USPN 6,757,241) as applied to claim 10 above, and

further in view of Crawford (USPN 6,549,561).

Regarding claim 11, the references teach a method as discussed in rejection of claim 10.

However, the references do not teach synchronizing a time reference with a transmitter

transmitting the OFDM symbols.

Crawford teaches synchronizing a time reference with a transmitter transmitting the

OFDM symbols **[Col. 6, lines 1-3]**.

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to synchronize the time with a transmitter since its well known in the art that this

information is included in the short symbol portion **[Col. 6, lines 1-3]**.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chandrahas Patel whose telephone number is 571-270-1211. The

examiner can normally be reached on Monday through Thursday 7:30 to 17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ricky Ngo can be reached on 571-272-3139. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

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like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CBP

RICKY Q. NGO
SUPERVISORY PATENT EXAMINER